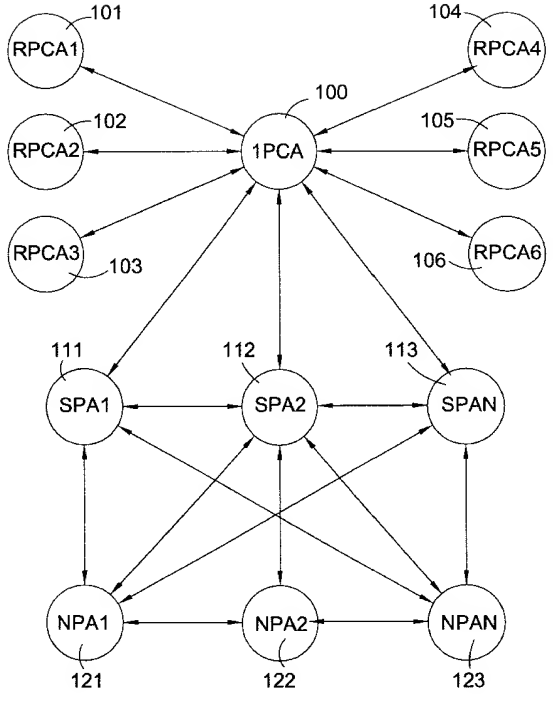
101
RPCA1
104
RPCA4
100
102
RPCA2
1PCA
105
RPCA5
User Level Negotiation
RPCA3
103
106
RPCA6
111
112
113
SPA1
SPA2
SPAN
Service Level Negotiation
Network Level Negotiation
NPA1
NPA2
NPAN
121
122
123

Fig.1

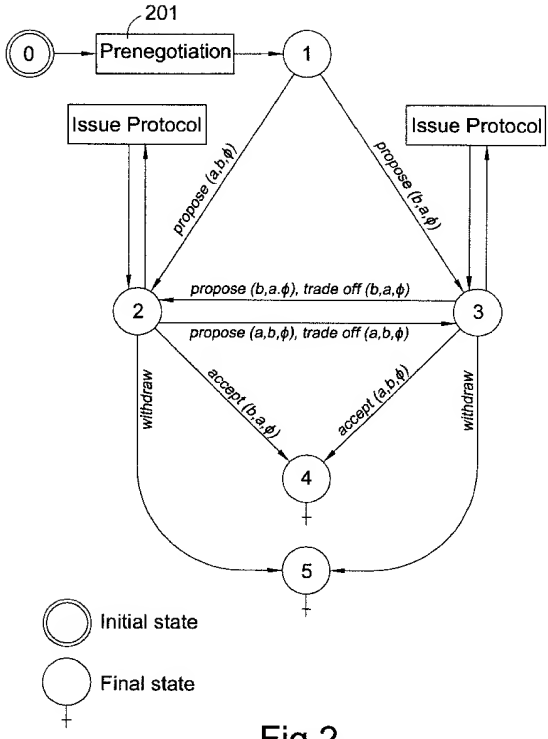
201
0
Prenegotiation
1
Issue Protocol
Issue Protocol
propose (a,b,ϕ)
propose (b,a,ϕ)
propose (b,a,ϕ), trade off (b,a,ϕ)
2
3
propose (a,b,ϕ), trade off (a,b,ϕ)
withdraw
accept (b,a,ϕ)
accept (a,b,ϕ)
withdraw
4
5
Initial state
Final state

Fig.2

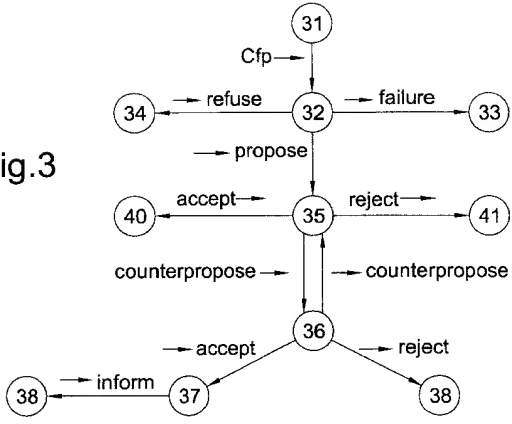
31
Cfp
34
refuse
32
failure
33
propose
40
accept
35
reject
41
counterpropose
counterpropose
36
accept
reject
38
inform
37
38

Fig.3

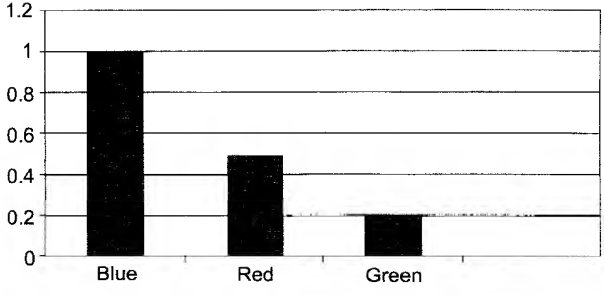
1.2
1
0.8
0.6
0.4
0.2
0
Blue
Red
Green

Fig.4

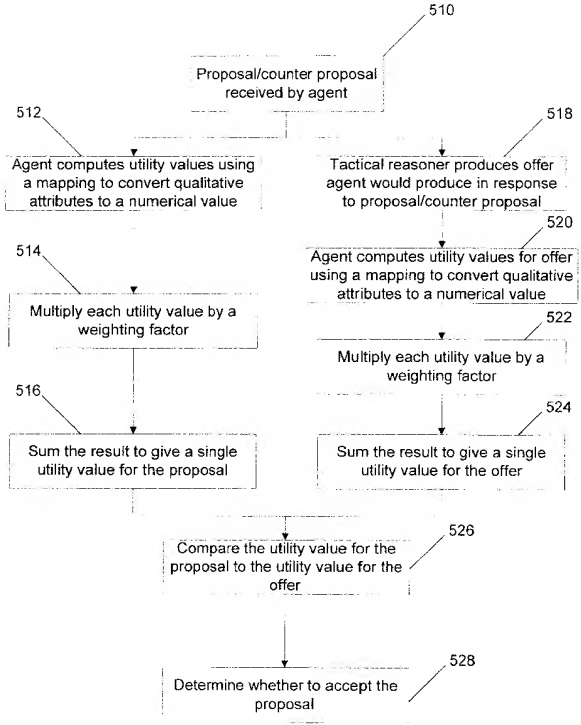
510
Proposal/counter proposal received by agent
512
Agent computes utility values using a mapping to convert qualitative attributes to a numerical value
514
Multiply each utility value by a weighting factor
516
Sum the result to give a single utility value for the proposal
518
Tactical reasoner produces offer agent would produce in response to proposal/counter proposal
520
Agent computes utility values for offer using a mapping to convert qualitative attributes to a numerical value
522
Multiply each utility value by a weighting factor
524
Sum the result to give a single utility value for the offer
526
Compare the utility value for the proposal to the utility value for the offer
528
Determine whether to accept the proposal

Fig.5

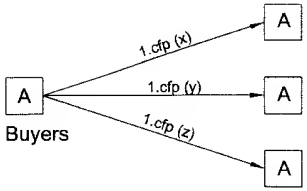

Fig.6

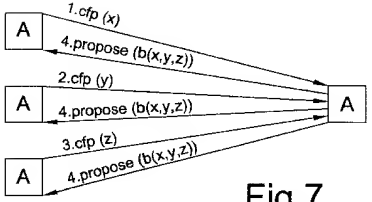

Fig.7

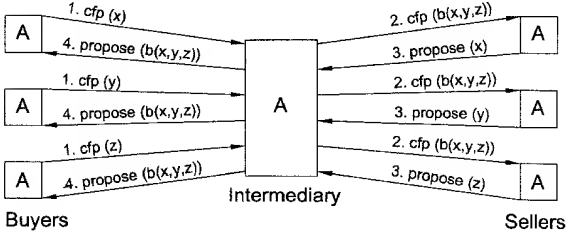

Fig.8

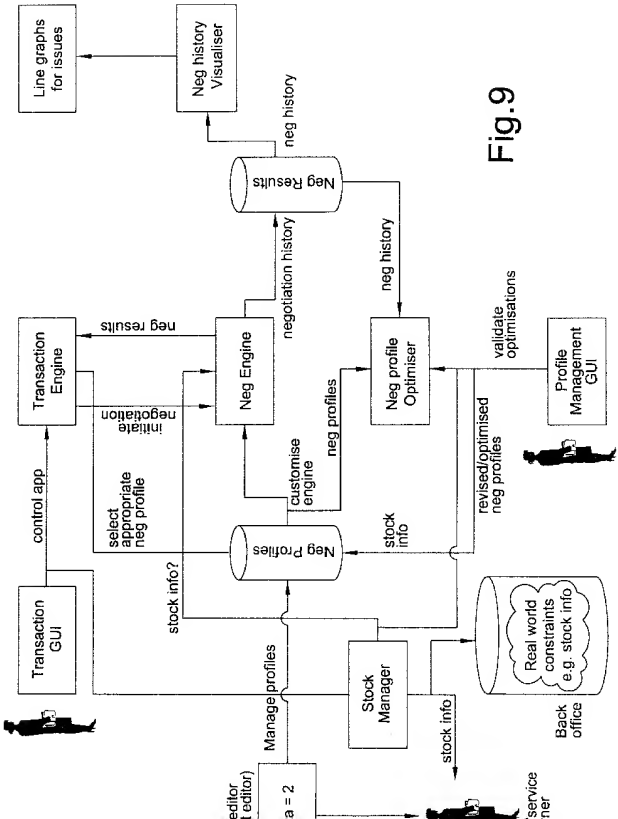
Line graphs for issues
Neg history Visualiser
neg history
Neg Results
negotiation history
neg history
neg results
Transaction Engine
Neg Engine
Neg profile Optimiser
validate optimisations
Profile Management GUI
initiate negotiation
customise engine
neg profiles
revised/optimised neg profiles
control app
select appropriate neg profile
stock info
Neg Profiles
stock info?
Transaction GUI
Manage profiles
Stock Manager
Real world constraints e.g. stock info
Back office
stock info
a = 2
editor
t editor)
Service
ner

Fig.9

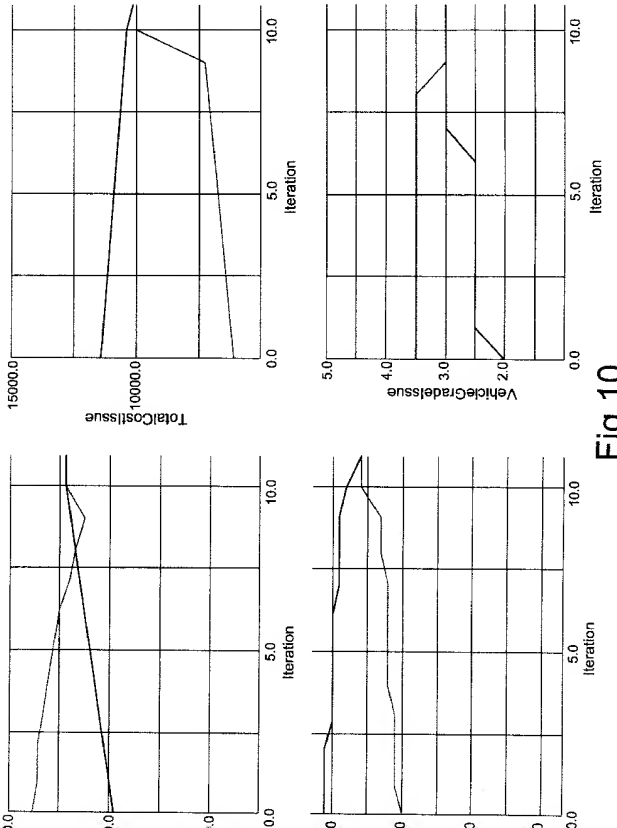
TotalCostIssue
15000.0
10000.0
0.0
5.0
10.0
Iteration
VehicleGradeIssue
5.0
4.0
3.0
2.0
0.0
5.0
10.0
Iteration
0.0
5.0
10.0
Iteration
0.0
5.0
10.0
Iteration

Fig.10

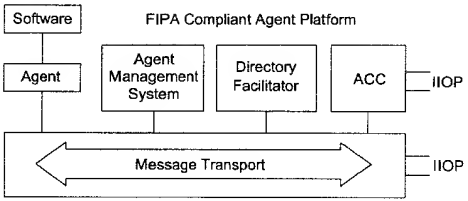
Software
FIPA Compliant Agent Platform
Agent
Agent Management System
Directory Facilitator
ACC
IIOP
Message Transport
IIOP

Fig.11

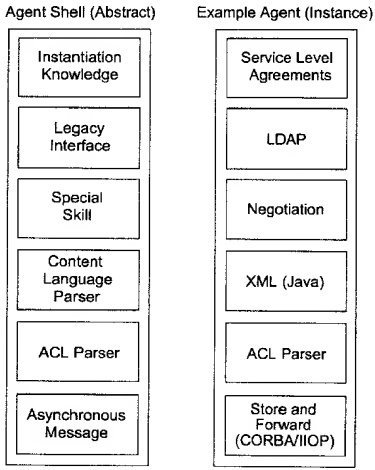
Agent Shell (Abstract)
Example Agent (Instance)
Instantiation Knowledge
Legacy Interface
Special Skill
Content Language Parser
ACL Parser
Asynchronous Message
Service Level Agreements
LDAP
Negotiation
XML (Java)
ACL Parser
Store and Forward (CORBA/IIOP)

Fig.12

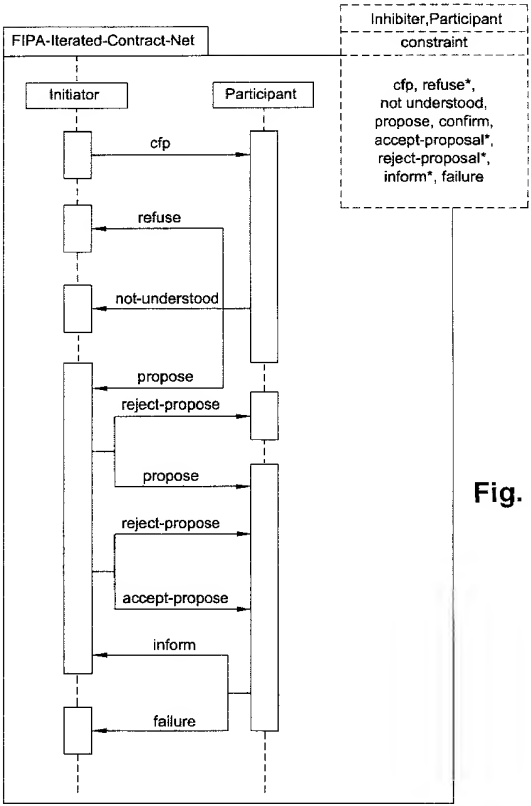
FIPA-Iterated-Contract-Net
Initiator
Participant
Inhibiter,Participant
constraint
cfp, refuse*, not understood, propose, confirm, accept-proposal*, reject-proposal*, inform*, failure
cfp
refuse
not-understood
propose
reject-propose
propose
reject-propose
accept-propose
inform
failure

Fig. 13